





Digitized by the Internet Archive  
in 2015

<https://archive.org/details/b2195222x>

*On Rendering Gunpowder Non-Explosive.* By Lieut.-Col.  
J. S. G. RYLEY, H.E.I.C.S., Edinburgh,\* late Bengal Cavalry.

In consequence of the disastrous results caused by explosions of large quantities of gunpowder from time to time, and the awful disaster at Erith and other places not long ago, and subsequently the great alarm created some time since, owing to the very large quantity of gunpowder stored in Edinburgh Castle, my attention has been especially directed of late to the endeavour to devise some plan by which gunpowder might be rendered less dangerous.

During the last twelve years upwards of fifteen serious explosions have been recorded in the public journals, by which more than 600 persons have been killed, and many thousand persons wounded, and property to the extent of more than two millions of pounds sterling has been destroyed.

After various experiments, extending over a considerable time, I succeeded in discovering a simple, inexpensive, and most efficacious method, which, if adopted by the Government, will not only render unnecessary the enormous expense of erecting new magazines, but be the means of saving human life, and much valuable property, both public and private.

The principle of my invention consists in filling up the interstices of the gunpowder, and thus thoroughly isolating the grains, with a non-combustible medium, which is required to be of very fine powder, so as to be readily and quickly sifted out again when the powder is required for use, and this property has been known to me for a long time.

Whilst I have recently paid special attention to this department of the subject, I may state that for many years I have more or less devoted myself to the consideration of various matters connected with gunpowder.

The great loss experienced when gunpowder is transported by land carriage in barrels, especially over the rude tracts in some parts of India, causes it to be much ground down to fine dust, which falls to the bottom of each barrel, and thus

\* Read before the Society, and experiments exhibited in illustration, 27th November 1865. Awarded the Society's Silver Medal.

creates a very considerable waste and loss, which is greatly aided by the custom of allowing 20 per cent. of space in each barrel to permit the surfaces to be shaken, and thereby to preserve the gunpowder from caking by damp, which commonly occurs when packed in the ordinary way in barrels.

I commenced my experiments in rendering gunpowder non-explosive, before I left India in 1855, by mixing it with finely powdered wood charcoal, which though combustible, rendered the gunpowder far less dangerous, and filled up the interstices, and caused it to burn like a squib when fire was applied to it.

By subsequent experiments I found bone dust far better suited to the purpose; but the presence of gelatine being objected to, I finally decided on trying bone ash, to which I give the preference.

I communicated my discovery to many of my friends upwards of a year ago, among whom I can name Dr C. W. Eddy, 49 Belgrave Road, London; Dr Stevenson Macadam, Edinburgh; and several others.

My great desire was to give the Government the full advantage of my invention without the restriction of a patent, and I requested my friend Dr Eddy to communicate the particulars of the discovery to the authorities at Woolwich and at the War Office; and in accordance therewith, Dr Eddy described my invention to General Lefroy, President of the Ordnance Select Committee, at Woolwich, on 12th November 1864, and afterwards to General Sir J. Burgoyne, President of the Magazine Committee, on 12th December 1864, at the War Office.

In order still further to ensure that sufficient attention should be paid to my invention, I forwarded a letter, on 16th December 1864, to Captain the Honourable G. Wrottesley, Secretary to the Magazine Committee, stating to him, for the information of General Sir J. Burgoyne, President, as also of the Members of the Committee on Magazines then sitting, that I had succeeded in discovering a plan of storing gunpowder by which its explosive power was reduced to the lowest degree, by mixing a certain substance with it which could be separated, when the gunpowder was required for



use, without difficulty and without the least injury to the powder; also, that if fire be applied to the powder when stored agreeably to my plan, instead of exploding *en masse* in the usual manner, it would merely burn like a squib. I further informed the Magazine Committee that the invention I alluded to was the same as that which had been laid before them on my behalf by my friend Dr Eddy. In order that the Society may judge of the efficacy of the plan I propose for rendering gunpowder non-explosive, I have now to give the following experimental details:—

#### LG (COMMON) POWDER.

##### *Mixing Material—Bone Ash.*

- A 1 oz. to 1 oz. Explosive; no powder left.
- B 1 „ to 2 „ Rapidly combustible, tending to explosion; few grains of powder left.
- C 1 „ to 3 „ Partially combustible; many grains of powder left.
- D 1 „ to 4 „ Partially combustible; powder only fired when in contact with red-hot iron; large number of particles of gunpowder left.
- E 1 „ to 4 „ *Glass instead of bone ash*, similar to C.

#### LARGE-GRAINED BEST SPORTING POWDER.

##### *Mixing Material—Bone Ash.*

- AA 1 oz. to 1 oz. Explosive; no powder left.
- BB 1 „ to 2 „ Rapidly combustible, tending to explosion; few grains of powder left.
- CC 1 „ to 3 „ Partially combustible; many grains of powder left.
- DD 1 „ to 4 „ Partially combustible; only particles fired when in contact with red-hot iron; large number of particles of powder left.

##### *Mixing Material—Glass.*

- EE 1 oz. to 4 oz. Partially combustible; many grains of powder left, similar to CC.

Similar results were obtained with large-grained blasting powder; and, moreover, a package of the gunpowder, mixed with bone ash, when placed in a furnace, did not explode.

Notwithstanding the success of my experiments, tried both by myself and confirmed by my friend Dr Eddy, in London, who tried them agreeably to my description before he submitted my invention to General Lefroy, I was surprised to find that, on 16th January 1865, the Secretary of State for War directed General St George, Director of Ordnance, to inform me that my method "had been duly considered, but that it was not found to possess sufficient advantage to warrant its adoption."

I was thus led to believe that the authorities at the War Office did not look with favour on this or any similar plan for protecting the lives of the lieges from disastrous explosions, and therefore I was scarcely prepared to find that, eight months subsequently, when a similar process was submitted to the War Office authorities at Woolwich and elsewhere, it was considered sufficiently novel and efficacious as to command the unqualified praise and admiration of not only the Secretary of State for War, who witnessed it at Wimbledon, and marked his approbation of the same by having it re-exhibited, at his express desire, before the Ordnance Select Committee at Woolwich. Moreover, all the leading journals of the day in July and August 1865 noticed the exhibition of the non-explosive gunpowder as an invention of the very highest importance, and one of them spoke of it as one of the wonders of the present age. Indeed, the experiments were witnessed and praised by Royalty itself.

The process which succeeded mine was covered by a provisional protection patent for six months, which bears date June 1865, being eight months after Dr Eddy had communicated my method to the war authorities.

Finding that all the credit of the invention was given to another as the discoverer of the identical plan originally proposed by me, I again communicated with the War Office authorities on 7th October 1865, claiming priority, but was surprised to find, instead of the Secretary of State for War acknowledging my right by complying with my reasonable

request, that he altogether evaded it, by directing me to be informed, in reply, that neither the plan proposed by me, nor that brought forward by another party, "for rendering gunpowder non-explosive, possessed any novelty, experiments having been made for testing the value of similar proposals in the year 1848."

I am certainly not aware of any experiments having been made in 1848. There are no records of any such in any of the public journals of that year that I am aware of, but, on the contrary, the fact that all the leading papers of July and August 1865 spoke of what was exhibited before the war authorities as not only a novelty, but designated the introducer as an "inventor" and a "discoverer" of the process, proves beyond the shadow of a doubt, that the experiments alluded to as having been tried seventeen years ago had never been made public, but had remained all that time an official secret, not even known to the Secretary of State for War himself.

Perhaps the process of protecting gunpowder, said to have been proposed in the memorable year 1848, when nearly the whole of Europe was in a revolutionary state, and Chartists were swarming in London itself, may have been regarded in the light of a very grave practical joke.

Having thus clearly established, by the infallible evidence of documentary facts and dates, my priority in regard to the novelty of rendering gunpowder non-explosive by mingling it with a medium which isolates the grains, and thus interrupts communication between the particles when brought in contact with fire, I may, in conclusion, state that the material I use is the best qualified for the purpose.

The particles of glass recommended by other parties are hard and gritty, and will necessarily tend to grind and rub down the grains of gunpowder; whilst the difference in the specific gravity of the powder and glass renders it easy for the particles of gunpowder to separate from the protective agent by mere agitation.

On the other hand, the bone ash I use is comparatively safe, possesses no irregular corners, and is thus incapable of grinding and injuring the grains of gunpowder, whilst, at



the same time, the specific gravities of bone ash and gunpowder are so nearly alike, that agitation of the gunpowder protected by it does not tend to separate the powder from the protective agent.

I have further to state, that I have some gunpowder which has been mixed with bone ash since December last, which, on being separated from the same, was tried in an eprouvette, and found to be as strong as when first mixed.

In my opinion, the necessity for rendering gunpowder non-explosive is imperative, and the invention which I have thus laid before the Society will, I believe, fully and satisfactorily supply the want which the inhabitants of these densely populated islands undoubtedly demand.

Should my method for rendering gunpowder safe be adopted, our magazines might be heated by flues, and thus rendered secure against damp, and consequently obviate an evil against which there is at present no effectual remedy.

This plan will not involve any great outlay, certainly not equal to the loss at present sustained through unavoidable damp in our very variable climate.









